

**Central lubrication device for underground mining machine - couples all lubrication lines via distributor to hydraulically-operated grease gun**

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Inventor(s): MERTEN GERHARD [DE]; WLEKLINSKI BERNHARD [DE]

Applicant(s): WESTFALIA BECORIT IND TECH [DE]

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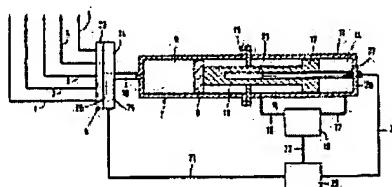
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**Abstract of DE 4036484 (A1)**

The lubrication device has lubrication lines (1..5) leading to the individual lubrication points, coupled at the lubrication station to a distributor (6) supplied via a grease ejection gun (7) having a driven ejection piston (8). The latter is operated via a hydraulic cylinder (11), with its piston (12) coupled to the grease gun piston via a piston rod (13). Pref. the hydraulic cylinder is supplied via a magnetic valve (18) with a common control device (20) coupled to the latter and to the distributor. ADVANTAGE - Allows simple replacement of grease cartridge.



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[0001] The invention relates to a mechanism for the central lubrication of mining industry machines, in particular the chain drives of untertägigen production and/or conveyors, whereby the lubrication lines leading to the single lubrication fittings are combined to a lubrication station for the lubrication by means of a grease gun.

### State of the art

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[0002] Mining industry machines, like in particular the high performance chain drives of chain scratching promoters and extraction machines, like above all coal ploughs, inserted in mining industry-operated, u.dgl., require as well known a regular lubrication of their bearings. Here grease over lubrication fittings becomes into the lubrication channels leading to the rolling bearings pressed by means of a grease gun (DE-PS 29 23 225). The pressed grease prevented also a penetration of dirt into the lubrication areas of the chain drums and/or. Chain wheels. If the regular lubrication is omitted, then this inevitable leads to heavy damages, which make a replacement of the expensive rolling bearings required.

[0003] It is known to unite with the chain scratching promoters inserted in Untertagebetrieben the lubrication lines leading to the rolling bearings of the chain drum to a lubrication station in order the two rolling bearings of the chain drum of only a side of the machine frame ago to lubricate to be able (DE-GM 75 16 607,3). The lubrication station exhibits accordingly two lubrication fittings, to which a grease gun can become attached.

[0004] Although chain scratching promoters and other chain drives in Untertagebetrieben become inserted since long time in large quantities, the experience that the lubrication instructions do not become frequent followed, shows a regular and/or sufficient lubrication of the bearings multiple is omitted. Heavy bearing failures, which lead to longer downtimes, are the inevitable sequence.

### Object

[0005] Object of the invention is it, a mechanism for the central lubrication of mining industry machines, in particular the heavy chain drives of chain scratching promoters, extraction machines, used in the bottom day employment, and. such. to create, with which ensured becomes that a regular and sufficient lubrication becomes the corresponding lubrication instructions of the manufacturers reliable performed.

[0006] This object becomes according to invention thereby disengaged that connected at the lubrication station the lubrication lines are to a distributor, with which the fat area of the stationary grease gun connected provided with a plunger piston drive is, and that the plunger piston drive and/or the distributor controlling control device is provided.

[0007] After the invention the central lubrication can become now also independent of the reliability of the maintenance staff the corresponding lubrication instructions automatic controlled performed. The arrangement can be met also in such a way that the lubrication becomes controlled effected after a predetermined lubrication program by the control device, which heads for thereby the distributor and/or the grease gun stationary in this case. It is possible to accomplish the group lubrication of a central office from controlled is it that a corresponding control command at the control device becomes triggered by hand, or that the control operation z. B. time-dependently fully automatic performed becomes.

[0008] For the plunger piston drive of the grease gun a convenient simple cylinder drive, preferably an hydraulic subjectable cylinder drive, becomes used. The arrangement can be met in such a way that that can become the plunger piston drive formed cylinder drive over of the control device controllable a valve, preferably a magnetic valve, of the pressure medium applied, in order to accomplish the lubrication controlled. Preferably the cylinder drive mentioned with the grease gun is light releasable connected. For the grease gun a commercial fat cartouche can become used in this case, which in the Füllzustand with the cylinder drive connected will and which can become replaced on emptying light against a new fat cartouche.

[0009] Over the distributor a lubrication by groups is possible. For example both rolling bearings of a chain drum of a chain scratching promoter simultaneous can be lubricated over the distributor. Preferably however the arrangement is met in such a way that over the distributor the connected lubrication lines controllable of the control device in sequence with the grease gun connected to become to be able, so that the lubrication of the different bearing points carries out itself in timed succession. For the distributor apparatuses of several kind can become used. With a particularly simple embodiment the distributor consists of a distributor valve provided with a controlled switching drive, which is preferably after type of a rotary valve or in addition, formed after type of a longitudinal slide valve.

[0010] The control device can become easily so executed that the lubrication z. B. from a timer controlled performed becomes. In addition, it can be so designed that the lubrication becomes performed after a predetermined lubrication program. This can be managed with the help of a programme control provided with a microcomputer. After a substantial invention characteristic the control device of the central lubrication mechanism is component of the development price increase planned in the untertägigen production enterprise, preferably an electrohydraulic development price increase. The development price increase transfers the control of the central lubrication in this case at the same time also, whereby in case of an electrohydraulic development price increase of the central computers of the Gewinnungstrebts or however an build-own microcomputer takes over the control of the lubrication procedure after the predetermined programme.

[0011] With the help of the mechanism according to invention also a selective dosage is that the single lubrication fittings supplied lubricant quantities of possible.

[0012] It is advisable, the piston stroke of the plunger piston of the grease gun and/or. to plan its cylinder drive measuring measuring device. This can serve only for the empty announcement the stationary grease gun. Preferably it serves in addition, for the quantity dosage that the single lubrication fittings supplied lubricant quantities. For the measuring device mentioned the known plunger lift measuring devices use can find, z. B. such with potentiometers disposed in the cylinder. Preferably however the cylinder drive of the grease gun an associated, becomes used in an axial bore of the piston rod of the cylinder drive immersing dipstick, favourable-proves in shape of a Reedstables provided with magnets for the measuring device, which can become connected over an electric measuring signal line to the control device.

[0013] With a chain scratching promoter it is advisable to arrange both at the main drive as well as at the auxiliary drive of the striving promoter in each case a lubrication station of the mentioned type existing from a chain scratching promoter. Both lubrication stations can become also from a common control device controlled, exhibit naturally in addition, in each case own control device. As mentioned, the control device becomes preferably formed of the anyway present development price increase.

[0014] The invention becomes subsequent in connection with in the drawing the illustrated embodiment more near explained.

#### ▲ top Ausführungsbeispiel

[0015] The drawing shows a central lubrication according to invention in schematic simplification in the diagram as well as the grease gun and the associated cylinder drive the same.

[0016] The represented mechanism serves for example for the central lubrication of the chain drums of a chain scratching promoter serving as striving promoters or the chain drums of a striving and a distance promoter at the striving distance transition. The lubrication lines 1 to 5, leading to the single lubrication fittings, are 6 connected to a common distributor. The lubrication station exhibits a stationary grease gun 7 with the plunger piston 8. That the grease female fat area 9 of the grease gun 7 is 6 connected at the bottom of the grease gun over a line 10 to the distributor. The grease gun 7 is provided with a plunger piston drive. This consists piston 12 over a piston rod 13 with the plunger piston 8 verbunden of an hydraulic subjectable cylinder drive 11, its is the piston area 14 and the annular space 15 is over hydraulic leads 16 and 17 to a magnetic valve 18 connected. By circuit of the magnetic valve 18 the piston area 14 or the annular space can accordingly alternatively become 15 hydraulic applied and that in each case different space with the hydraulic return connected.

[0017] The grease gun 7 preferably consists of a simple fat cartouche, whose can become the grease female cylinder part with 19 light releasable with the cylinder part of the cylinder drive 11 connected. Case in the fat area 9 of the grease gun 7 no more quantity of grease still sufficient for the lubrication contained is, can the fat cartouche of the cylinder drive 11 disengaged and against a cartridge replaced filled with grease become.

[0018] The distributor 6 with the stationary grease gun 7 and the cylinder drive 11 forms the lubrication station, the z. B. at the machine frame of the chain scratching promoter mounted is. The lubrication station associated is a control device 20. This is over a control line 21 with the distributor 6 and 18 connected over an other control line 22 with the magnetic valve. Over the control line 22 the magnetic valve becomes 18 driven and/or. switched. The distributor 6 can consist of a simple distributor valve with associated (not represented) switching drive, preferably a slidegate valve and/or. Rotary valve. The distributor 6 exhibits a fixed port plate 23, to which the single lubrication lines are 1 to 5 connected, preferably on a common pitch circle. Furthermore the distributor is provided with a plate 24, to which the grease line is 10 of the grease gun connected and which is more rotatable with the help of the aforementioned switching drive opposite the standing port plate 23, whereby the lubrication lines 1 to 5 single with the grease line 10 and thus with the grease gun connected to become to be able. Inside the plate 24 a angle channel can be 25 disposed, which is 10 connected in the disk center with the grease line and to which at that directed front surface flows to the plate 23 with 26 at a location, which is on the common pitch circle of the lubrication line adapters of the plate 23. By tricks of the plate 24 with the help of the switching drive can become thus the lubrication lines 1 to 5 single and into succession with the grease line 10 of the grease gun 7 connected if necessary. It understands itself that the rotatable distribution plate operated of the switching drive becomes 24 disposed in a valve housing. In addition, in place of the distributor 6 formed as rotary valves distributors of other type can do, also such after type of longitudinal slide valves od.dgl. used become. Substantial one is above all that with the help of the distributor 6 the different lubrication fittings single or if necessary also by groups with the grease line 10 of the grease gun 7 connected to become to be able.

[0019] Inside the cylinder drive 11 is a measuring device, those the piston stroke of the plunger piston 8 and/or. the piston 12 connected with it measures. With the represented embodiment the measuring device exists of a dipstick 27 in shape of an actual known Reedstables, which is at the bottom 28 of the cylinder drive fixed and in central by the piston 12 and the piston rod 13 pass through-ends axial bore 29 dives in. The Reedstab 27 is provided in known manner with permanent magnets, which cooperate with a ring magnet, so that 20 supplied with the stroke movements of the piston 12 electric measurement signals become over a line 30 of the control device. Over the electric measurement signals therefore 12 as well as the stroke position of these pistons detected accomplished in each case becomes at the control device 20 with the lubrication procedure stroke way of the pistons 8.

[0020] With the represented embodiment the control device 20 steers the cylinder drive 11 on the one hand via the

magnetic valve 18 and on the other hand via the control line 21 the switching drive of the distributor 6 in the manner that 7 connected after the predetermined lubrication program the single lubrication lines 1 to 5 become into succession the lubrication of the respective chain drum camps with the output of the grease gun. During the lubrication procedure the piston area 14 of the cylinder drive 11 becomes hydraulic applied, so that the grease of the plunger piston 8 in an amount, located in the fat area 9, which is dependent from the piston stroke, into which respective lubrication line becomes pressed out and supplied over these the associated lubrication fitting. Also a quantity dosage is possible with the help of the measuring device measuring the piston stroke.

[0021] The control device 20 becomes convenient executed as programme control, which accomplishes the central lubrication in dependence of a predetermined lubrication program. That can become the respective lubrication fittings supplied grease volumes accurate metered. With the help of exhibiting stroke measuring device thus if necessary also a grease amount price increase can the Reedstab 27 be caused. Beyond that also a level announcement of the fat area 9 of the grease gun 7 can be reached with this measuring device. If the grease quantity located in the fat area 9 is not sufficient any longer for the lubrication procedure, then an optical can and/or acoustic signal given become, which the change of the grease gun and/or. indicates to the fat cartouche.

[0022] The control device 20 becomes preferably formed of the development price increase anyway present in the longwall mining, preferably the electrohydraulic development price increase. During an electrohydraulic development price increase the strive-central control computers or an build-own microcomputer disposed at a development unit can take over the function of the control device 20.

[0023] With a striving promoter both at the main drive as well as at the auxiliary drive a lubrication station of the described type can become provided in each case. The two lubrication stations can exhibit own control device 20 in each case or in addition, a common control device. Also in this case the control operation becomes preferably effected with the help of the present development price increase.

[0024] It understands itself that the number of the lubrication lines connected to the distributor 6 can be different. During plane production the convenient chain drives become both the plane and the striving promoter (chain scratching promoter) at the main and auxiliary drive in each case with their lubrication lines to the distributor 6 of a lubrication station connected.

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1. Mechanism for the central lubrication of mining industry machines, in particular the chain drives of untertägigen production and/or conveyors, whereby the lubrication lines leading to the single lubrication fittings are combined to a lubrication station for the lubrication by means of a grease gun, characterised in that at the lubrication station the lubrication lines (1 to 5) to a distributor (6) connected it is, with which the fat area (9) of the stationary grease gun (7), provided with a plunger piston drive (11), connected is, and the fact that the plunger piston drive (11) and/or the distributor (6) controlling control device (20) provided is.
2. Mechanism according to claim 1, characterised in that the plunger piston drive from one, preferably hydraulic subjectable cylinder drive (11) exists.
3. Mechanism according to claim 2, characterised in that that the plunger piston drive formed cylinder drive (11) over a valve (18), controllable of the control device (20), preferably a magnetic valve, of the pressure medium is subjectable.
4. Mechanism after one of the claims 1 to 3, characterised in that of the distributors (6) of a distributor valve, preferably after type of a rotary valve or a longitudinal slide valve, provided with a controlled switching drive, consists.
5. Mechanism after one of the claims 1 to 4, characterised in that over the distributor (6), driven of the control device (20), the connected lubrication lines (1 to 5) in sequence with the grease gun (7) are more connectable.
6. Mechanism after one of the claims 1 to 5, characterised in that the control device (20) of the development price increase of the Gewinnungsstrebis formed is.
7. Mechanism after one of the claims 1 to 6, characterized by a metering unit to the selective dosage of the lubricant quantities.
8. Mechanism according to claim 7, characterised in that the piston stroke of the plunger piston (8) measuring measuring device provided is.
9. Mechanism according to claim 8, characterised in that the measuring device from the cylinder drive (11) an associated, dipstick (27), immersing in an axial bore (29) of the piston rod (13) of the cylinder drive, preferably a Reedstab, exists, which is connected over an electric measuring signal line (30) to the control device (20).
10. Mechanism after one of the claims 2 to 9, characterised in that the cylinder drive (11) with the grease gun (7) light releasable connected is.
11. Mechanism after one of the claims 1 to 10, characterised in that in each case a lubrication station at the main and auxiliary drive of the striving promoter disposed existing from a chain scratching promoter is, whereby both lubrication stations are controllable by own control device or a common control device (20), preferably by the development price increase, in each case.

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